

Claims

- [c1] 1. A method of recovering heat energy during blowdown of a steam boiler, comprising:providing a supply of feed-water to replenish water in said steam boiler during blowdown;removing blowdown water from said steam boiler;producing flash steam from said blowdown water;transferring thermal energy contained in said flash steam to a mass of water; andtransferring thermal energy in said blowdown water remaining after production of said flash steam to said feedwater.
- [c2] 2.The method of claim 1, wherein said mass of water is said feedwater.
- [c3] 3.The method of claim 1, wherein said mass of water is a separate body of water in an open vented tank.
- [c4] 4 The method of claim 2, wherein said blowdown water is transferred from said boiler to a flash chamber to generate said flash steam, and said flash steam is fed from said flash chamber into said feedwater so as to condense therein.
- [c5] 5.The method of claim 4, wherein said blowdown water flows from said flash chamber into a blowdown recovery

vessel, and fresh make-up water flows through a heat exchanger immersed in said blowdown recovery vessel to recover thermal energy therefrom and said make-up water thereafter flows from said heat exchanger into a feedwater tank.

[c6] 6.The method of claim 5, wherein said flash steam is fed directly from said flash chamber into said feedwater in said feedwater tank.

[c7] 7.The method of claim 5, wherein said feedwater from said feedwater tank is passed through a second heat exchanger in said blowdown recovery vessel prior to flowing into said boiler so as to absorb additional heat from said blowdown water after absorbing heat from said flash steam.

[c8] 8.The method of claim 5, wherein any overflow water in said blowdown recovery vessel is extracted from near the bottom of said blowdown recovery vessel.

[c9] 9. A blowdown apparatus for use with a steam boiler, comprising:a blowdown recovery vessel for containing blowdown water from the steam boiler;a feedwater tank for containing a supply of feedwater to replenish water in the steam boiler; a heat exchanger for transferring heat energy from said blowdown water to make-up water

flowing into said feedwater tank;a flash tank for producing flash steam from said blowdown water; anda conduit for directing said flash steam into a tank containing a mass of water so as to transfer heat energy contained in said flash steam to said mass of water.

- [c10] 10.The blowdown apparatus of claim 9, wherein said tank containing a mass of water is said feedwater tank.
- [c11] 11.The blowdown apparatus of claim 9, wherein said tank containing a mass of water is an open vented tank.
- [c12] 12.The blowdown apparatus as claimed in claim 9, wherein said conduit feeds said flash steam directly into feedwater in said feedwater tank so that said flash steam condenses therein.
- [c13] 13. The blowdown apparatus as claimed in claim 12, wherein said conduit terminates in a muffler.
- [c14] 14.The blowdown apparatus as claimed in claim 12, wherein said flash tank is mounted on top of said blowdown recovery vessel so that blowdown water drops down from said feedwater tank into said blowdown recovery vessel.
- [c15] 15.The blowdown apparatus as claimed in claim 9, further comprising a second heat exchanger in said blow-

down recovery vessel arranged so that feedwater from said feedwater tank flows through said second heat exchanger before flowing into said boiler.

- [c16] 16. The blowdown apparatus of claim 9, further comprising an overflow conduit terminating near the bottom of said blowdown recovery vessel so that overflow water is drawn from near the bottom of said blowdown recovery vessel.